

REMARKS

Claims 1-7 and 16-18 are pending in this application. Claims 8-15 and 19 were previously canceled without prejudice or disclaimer. Claims 1 and 16 are amended herein to recite the phrase "genome promoter." Support for that amendment can be found throughout the specification, *e.g.*, at paragraphs [0024] and [0049]. Claims 1 and 16 also are amended to recite the phrases "wherein the pyruvate decarboxylase gene on the host chromosome is replaced with the DNA for coding the foreign protein having lactate dehydrogenase activity," and "wherein the pyruvate decarboxylase 1 gene on the host chromosome has been replaced with the DNA for coding a bovine-derived lactate dehydrogenase or its homologue," respectively. Support for those amendments can be found throughout the specification, *e.g.*, at paragraphs [0026]-[0027]. Finally, claim 1 is amended to recite the phrase "[a] bacterial or yeast transformant." Support for that amendment can be found throughout the specification, *e.g.*, at paragraph [0031]. Thus, no new matter has been added by these amendments.

FORMAL MATTERS

A. IDS, Priority, and Withdrawn Objections and Rejections

Applicant acknowledges, with appreciation, that the Office has accepted the Information Disclosure Statement filed November 20, 2007, and the claim to benefit of priority to Japanese Application 2002-065880, filed March 11, 2002. See Office Action at p. 2. Applicant also acknowledges, with appreciation, that the Office has withdrawn the following objections and rejections:

- The objection to the specification, because "the phrase 'sequence number' has been replaced by 'SEQ ID NO:'." *Id.* at p. 3;

- The objection to the drawings, because “[t]he replacement drawing for Figure 9 satisfactorily overcomes the outstanding objection to the drawings.” *Id.*;
- The objection to claims 6, 7, and 17, because “[t]he applicant has amended the claims so that ‘Saccharomyces’ is correctly spelled.” *Id.*;
- The objection to claims 3-5, “because the phrase ‘sequence number’ has been replaced by ‘SEQ ID NO:’.” *Id.*;
- The rejection of claims 1-7 and 16-18 under 35 U.S.C. § 112, ¶ 2, because “[t]he claim amendments have overcome all indefiniteness.” *Id.* at p. 4;
- Part of the rejection of claims 1-7 and 16-18 under 35 U.S.C. § 112, ¶ 1, because “[t]he examiner accepts [applicant’s] argument as sufficient to overcome the portion of the written description rejection based on lack of possession of the genus of lactate dehydrogenase homologues and the genus of pyruvate decarboxylase promoters.” *Id.* at p. 5;
- The rejection of claims 16-18 under U.S.C. § 112, ¶ 1, because these claims “have been amended to limit the scope of the transformants of the *Saccharomyces* family¹. Therefore, the examiner believes the specification to have sufficient evidence of possession for this scope.” *Id.*; and

¹ Applicant notes that original claims 16-18 recited transformants of the *Saccharomyces* family. Thus, the amendments presented on November 20, 2007, did not further narrow the scope of those claims.

- The rejection of claims 16 and 17² under 35 U.S.C. § 112, ¶ 1, because “[t]he examiner finds [applicant’s arguments] sufficiently persuasive to overcome the lack of enablement rejection based on isolated nucleic acids identified by hybridizing to the *S. cerevisiae* pyruvate decarboxylase 1 promoter.” *Id.* at 6.

B. Statements Made in the Office Action

To ensure an accurate record, Applicant respectfully provides the following comments regarding statements made in the Office Action. First, the Office incorrectly contends that “applicant does not specifically indicate which teachings [of the claims] are not present in Porro et al.” Office Action at p. 7. However, Applicant notes that the paragraph bridging pages 21-22 of the Amendment dated November 20, 2007, expressly recites the claim elements that *Porro* fails to teach.

Second, the Office incorrectly contends that Applicant’s statements regarding the production of lactic acid “without suppression of pyruvate decarboxylase” and “while simultaneously destroying the pyruvate decarboxylase gene that suppresses the production of lactic acid” are contradictory. Office Action at 9. The Office apparently has misconstrued this argument. If the host’s endogenous pyruvate decarboxylase gene has been destroyed, *e.g.*, by replacement with the gene for coding a foreign protein having lactate dehydrogenase activity, as required by the instantly claimed invention, there is no need to suppress the activity of the pyruvate decarboxylase protein, as discussed in *Porro* at column 11, lines 42-48. One cannot suppress the

² Applicant notes that although the Office Action refers to claims 16-18 on page 6 of the Office Action, only claims 16 and 17 were rejected as allegedly lacking enablement in the Office Action dated June 20, 2007.

activity of a protein that is not expressed. Accordingly, the instantly claimed invention avoids the need to suppress endogenous pyruvate decarboxylase activity because the endogenous decarboxylase gene has been destroyed.

CLAIM REJECTIONS UNDER 35 U.S.C. § 112 ¶ 1 - WRITTEN DESCRIPTION

The Examiner maintains the rejection of claims 1-7 under 35 U.S.C. § 112, ¶ 1 as allegedly failing to comply with the written description requirement. See Office Action at pp. 4-6. Specifically, the Office contends that “[w]hile it is established that transgenic animals and plants have been made for years, the instant application contains no examples of these organisms which contain the genetic modifications recited in the instant claims. Therefore, the examiner concludes that the disclosure is not sufficient to show that a skilled artisan would recognize that the applicant was in possession of the claimed genus of ‘transformants’ commensurate to its scope at the time the application was filed.” *Id.* at p. 5. Applicant respectfully traverses.

First, Applicant notes that the rejection of claims 6 and 7 appears to be in error. Claims 6 and 7 limit the scope of claims 1-5 to host organisms belonging to the *Saccharomyces* family, and to *Saccharomyces cerevisiae*, respectively. As the Office acknowledges, the specification provides adequate written description support for “transformants of the *Saccharomyces* family.” Office Action at 5. Thus, by the Office’s admission, claims 6 and 7 are adequately supported by the specification.

With respect to claims 1-5, the Office appears particularly concerned that the specification allegedly does not provide support for transgenic animals and plants. Without acquiescing to the rejection, and solely to facilitate prosecution, Applicant has

amended claim 1 to recite bacterial and yeast transformants. Accordingly, the currently pending claims do not read on transgenic animals and plants, as alleged by the Office.

The specification provides adequate support for the claimed genus of bacterial and yeast transformants. As discussed in the Amendment filed November 20, 2007, an adequate disclosure of a claimed genus exists if an ordinary artisan could predict the operability in the invention of species other than the ones disclosed. See M.P.E.P. § 2163, 8th Edition, September 2007 Revision. What constitutes a sufficient disclosure of a representative number of species is an inverse function of the skill and knowledge in the art. *Id.* Given the inverse correlation between the level of skill and knowledge in the art and the specificity of disclosure necessary to satisfy the written description requirement, information which is well known in the art need not be described in detail in the specification. *Id.*, (citing *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367 (Fed. Cir. 1986)).

Here, the specification provides ample support for the claimed genus of bacterial and yeast transformants. For example, paragraph [0031] of the specification teaches:

For the host cell, it is possible to use a bacterium such as *Escherichia coli* or *Bacillus subtilis*; a yeast such as *Saccharomyces cerevisiae*, *Saccharomyces pombe*, or *Pichia pastoris* The host cell should preferably be a microbe, such as a yeast, that causes alcoholic fermentation, or an acid-resistant microbe, examples of which include yeasts represented by the *Saccharomyces* family, such as *Saccharomyces cerevisiae*. Specific examples include the *Saccharomyces cerevisiae* IFO2260 strain and YPH strain.

(Emphasis added). In addition, pages 9-17 of the specification provide a detailed disclosure of the construction and analysis of yeast transformants expressing the bovine

lactate dehydrogenase protein. Thus, the specification provides adequate written description support for the claimed genus of bacterial and yeast transformants

Moreover, as discussed in the Amendment filed November 20, 2007, at the time the instant application was filed, the level of skill and knowledge in the art regarding microbial hosts for gene transformation was high. Thus, based on the ample support provided in the specification, an ordinary artisan readily could predict that Applicant was in possession of the claimed genus of bacterial and yeast transformants at the time the application was filed. Accordingly, Applicant respectfully submits that the specification provides adequate written description support for the instantly claimed invention.

For at least these reasons, Applicant respectfully requests that the § 112, ¶ 1 written description rejection of claims 1-7 be withdrawn.

CLAIM REJECTIONS UNDER 35 U.S.C. § 102

The Examiner maintains the rejection of claims 1-4, 6-7, and 16-18 under 35 U.S.C. §§ 102(b) and (e) as allegedly anticipated by U.S. Patent No. 6,429,006 or WO 99/14335 to Porro et al. ("*Porro*"). See Office Action at pp. 6-13. Specifically, the Office contends, "Porro teach both (1) efficient production of large volumes of lactic acid by yeast expressing lactate dehydrogenase using a high expressing promoter and (2) destruction of pyruvate decarboxylase gene. The examiner believes this is what the instant claims recite." *Id.* at p. 9. Applicant respectfully traverses.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." M.P.E.P. § 2131 (quoting *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)) (emphasis added). Further, a rejection under

§ 102 is proper only when the claimed subject matter is identically described or disclosed in the prior art. *In re Arkley*, 455 F.2d 586, 587 (CCPA 1972) (emphasis added). The identical invention must be described in as complete detail as is contained in, and must be arranged as required by, the claim. M.P.E.P. § 2131. Applicants submit that *Porro* cannot anticipate the instantly claimed invention because it fails to teach several of the elements of the instantly claimed invention.

For example, claims 1 and 16 require that the DNA for coding the foreign lactate dehydrogenase protein has been incorporated such that it is “under the control of the genome promoter of the pyruvate decarboxylase gene on the host chromosome, or such that it is under the control of a structural and functional homologue of the promoter of the pyruvate decarboxylase gene, which replaces the genome promoter of the pyruvate decarboxylase gene on the host chromosome.” See claim 1 (claim 16 recites a similar element). In contrast, *Porro* does not teach that the foreign lactate dehydrogenase gene is incorporated such that it is under the control the host’s genome pyruvate decarboxylase gene promoter (or a structural and functional homologue of the host’s genome pyruvate decarboxylase gene promoter, which replaces the host’s genome promoter). Instead, *Porro* teaches that the foreign lactate dehydrogenase genes are controlled by exogenous 5’ regulatory sequences or promoter regions (see *Porro* at col. 11, ll. 31-36), which is not equivalent to being controlled by the host’s genome pyruvate decarboxylase promoter, as required by claims 1 and 16. Thus, *Porro* does not teach this structural element of the claims.

In addition, claim 1 requires that the foreign lactate dehydrogenase protein has a “pyruvic acid substrate affinity that equals or exceeds the pyruvic acid substrate affinity

of the pyruvate decarboxylase inherent in the host organism.” In contrast, *Porro* does not disclose any pyruvic acid substrate affinities for the lactate dehydrogenase proteins disclosed therein. Thus, *Porro* does not teach this functional element of claim 1.

Finally, claims 1 and 16 recite transformants “wherein the pyruvate decarboxylase gene on the host chromosome is replaced with the DNA for coding the foreign protein having lactate dehydrogenase activity.” See claim 1 (claim 16 recites a similar element). In contrast, *Porro* does not teach that the pyruvate decarboxylase gene on the host chromosome is replaced with the foreign lactate dehydrogenase gene. Instead, as the Office admits, *Porro* merely teaches that the host’s pyruvate decarboxylase gene may be deleted, e.g., by inserting selectable markers, point mutations, frame-shift mutations, or stop codons (see *Porro* at col. 5, ll. 4-22), none of which are equivalent to replacing the pyruvate decarboxylase gene on the host chromosome with the foreign lactate dehydrogenase gene, as required by claims 1 and 16. Thus, *Porro* does not teach this structural element of the claims.

For at least these reasons, Applicant submits that the instantly claimed invention is novel over *Porro*. Accordingly, Applicant respectfully requests that the rejection of claims 1-4, 6-7, and 16-18 under 35 U.S.C. §§ 102(b) and (e) be withdrawn.

CONCLUSION

Applicant respectfully requests that this Amendment under 37 C.F.R. § 1.116 be entered by the Office, placing claims 1-7 and 16-18 in condition for allowance. Applicant submits that the proposed amendments of claims 1 and 16 do not raise new issues or necessitate the undertaking of any additional search of the art by the Office, since all of the elements and their relationships claimed were either earlier claimed or

inherent in the claims as examined. Therefore, this Amendment should allow for immediate action by the Office.

Furthermore, Applicant respectfully points out that the Final Office Action presented some new arguments as to the application of the art against Applicant's invention. It is respectfully submitted that the entering of the Amendment would allow the Applicant to reply to the final rejections and place the application in condition for allowance.

Finally, Applicant submits that the entry of the amendment would place the application in better form for appeal, should the Examiner continue to dispute the patentability of the pending claims.

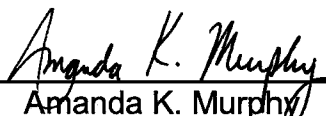
In view of the foregoing remarks, Applicant submits that the claims, as amended, are patentable over the prior art references cited against this application. Applicant therefore requests the entry of this Amendment, the Office's reconsideration of the application, and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

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By: 
Amanda K. Murphy
Reg. No. 59,387